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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/622,401	08/16/2000	Hans Goran Evald Martin	P/3658-10	3531

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EXAMINER

LEE, SHUN K

ART UNIT	PAPER NUMBER
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2878

DATE MAILED: 03/07/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/622,401

Applicant(s)

MARTIN ET AL.

Examiner

Shun Lee

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 31 December 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 57-62, 64, 65, 67-78, 81, 82, 84-86, 88-100 and 102-104 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 57-62, 64, 65, 67-78, 81, 82, 84-86, 88-100 and 102-104 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 8/16/00 & 12/31/02 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 31 December 2002 has been entered.

### ***Drawings***

2. The corrected or substitute drawings were received on 31 December 2002. These drawings are acceptable.

### ***Claim Objections***

3. Claims 68, 71, 88-92, 97, 100, 102, and 103 are objected to because of the following informalities:

- (a) in claim 68: (a1) "the source of incident electromagnetic waves" on lines 1-2 in claim 68 (there is insufficient antecedent basis for this limitation in the claim) should probably be --the source of electromagnetic radiation--; (a2) "incident electromagnetic radiation" on lines 2-3 in claim 68 should probably be --the electromagnetic radiation--; and (a3) "incident electromagnetic waves" on line 4 in claim 68 should probably be --the electromagnetic radiation--;
- (b) in claim 71, "the "nth" column" on line 4 should probably be --the "1st" column-- (see Figs. 11-13);

- (c) in claim 88, "the base structure" on line 2 and again on line 4 (there is insufficient antecedent basis for this limitation in the claim) should probably be --the base plate--;
- (d) in claim 89, "incident electromagnetic waves" on line 2 and again on lines 3-4 and "the waves" should probably be --said electromagnetic radiation-- (see line 8 in claim 102);
- (e) in claim 90, "the base structure" on line 3 (there is insufficient antecedent basis for this limitation in the claim) should probably be --the base plate--;
- (f) in claim 91, "the detector" on line 6 should probably be --the electromagnetic radiation detector-- (to avoid confusion with "gas detector" on line 1);
- (g) in claim 92: (g1) "the base structure" on line 2 in claim 92 (there is insufficient antecedent basis for this limitation in the claim) should probably be --the base plate--; (g2) "the "nth" column" on line 5 in claim 92 should probably be --the "1st" column-- (see Figs. 11-13); and (g3) "except" on line 6 in claim 92 should probably be deleted;
- (h) in claim 97: (h1) "one of the two metal layers" on line 1 in claim 97 should probably be --the first metal layer--; and (h2) "the metal layers" on line 4 in claim 97 should probably be deleted;
- (i) in claim 100: (i1) "the base structure" on line 1 in claim 100 (there is insufficient antecedent basis for this limitation in the claim) should probably be --the base plate--; and (i2) "the detectors" on line 2 in claim 100 should probably be --the electromagnetic radiation detector--;

(j) in claim 102: (j1) "the detector" on line 9 in claim 102 should probably be --the electromagnetic radiation detector-- (to avoid confusion with "gas detector" on line 1); (j2) "the layers" on line 13 in claim 102 should probably be --said first and second electrically conductive metal layers--; and (j3) "at least one metal layer" on line 7 in claim 102 should probably be --at least one reflective metal layer-- (to avoid confusion between "first and second electrically conductive metal layers" and "at least one metal layer"); and

(k) in claim 103, "the circuit arrangements" on line 1 should probably be --circuit arrangements--.

Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 75 and 96 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The specification discloses (paragraph beginning at line 17 of pg. 31) that the heat reflecting layer is comprised of the reflective metal layers M1, M2. However, claims 75 and 96 recites the limitation "a metal layer" which was not described in the specification.

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6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 57-62, 64, 65, 67-78, 84-86, 97, 100, and 104 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 59 recites the limitation "the base structure" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim. Claim 59 also recites the limitation "the thermal element" in line 4. There is insufficient antecedent basis for this limitation in the claim. Further, claim 59 recites the limitation "said detector" in line 3 which is vague and indefinite since it is unclear whether "gas detector" or "electromagnetic radiation detector" is the antecedent basis for this limitation in the claim.

Claim 60 recites the limitation "said base structure" in line 1 and the limitation "the base structure" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 61 recites the limitation "the structure" in line 3 which is vague and indefinite since the antecedent basis for this limitation in the claim is unclear. Claim 61 recites the limitation "the detector" in line 3 which is vague and indefinite since it is unclear whether "gas detector" or "electromagnetic radiation detector" is the antecedent basis for this limitation in the claim. In addition, the limitation "a topographical structure" in line 3 in claim 61 is indefinite and can lead to misinterpretation.

Claim 62 recites the limitation "the base structure" in line 1 and line 3. There is insufficient antecedent basis for this limitation in the claim. Claim 62 also recites the limitation "the cavity" in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim 65 recites the limitation "said metal layers" in line 2 and "the metal layers" in line 3 which are vague and indefinite since it is unclear whether "at least one metal layer" or "first and second electrically conductive metal layers" is the antecedent basis for these limitations in the claim. Also, claim 65 recites the limitation "the components" in line 3. There is insufficient antecedent basis for this limitation in the claim. Further, claim 65 recites the limitations "said detector" in line 2 and "the detector" in lines 3-4 which are vague and indefinite since it is unclear whether "gas detector" or "electromagnetic radiation detector" is the antecedent basis for these limitations in the claim.

Claim 69 recites the limitation "the base structure" in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim 70 recites the limitation "the conductive ridges" in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim 71 recites the limitation "the conductive ridges" in lines 1 and 7. There is insufficient antecedent basis for this limitation in the claim.

Claim 73 recites the limitation "the conductive ridges" in lines 1 and 5. There is insufficient antecedent basis for this limitation in the claim.

Claim 74 recites the limitation "the conductive ridges" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 76 recites the limitation "the metal layers" in lines 1 and 3 and the limitation "the metal layers" in line 4 which are vague and indefinite since it is unclear whether "at least one metal layer" or "first and second electrically conductive metal layers" is the antecedent basis for this limitation in the claim. Also, "the electromagnetic waves" on line 2 and again on line 3, "the incident electromagnetic waves" on lines 3-4 and again on line 6, and "the incident electromagnetic radiation" on lines 7-8 should probably be --said electromagnetic radiation--.

Claim 84 recites the limitation "the base structure" in line 1. There is insufficient antecedent basis for this limitation in the claim. Claim 84 also recites the limitation "the cavity" in line 3. There is insufficient antecedent basis for this limitation in the claim. Further, claim 84 recites the limitation "the detector" in line 2 which is vague and indefinite since it is unclear whether "gas detector" or "electromagnetic radiation detector" is the antecedent basis for this limitation in the claim.

Claim 85 recites the limitation "the cavity" in line 1. There is insufficient antecedent basis for this limitation in the claim. Further, claim 85 recites the limitation "the detector" in line 2 which is vague and indefinite since it is unclear whether "gas detector" or "electromagnetic radiation detector" is the antecedent basis for this limitation in the claim (perhaps what was meant is --said at least one reflective metal layer is the same metal as said first electrically conductive metal layer or said second electrically conductive metal layer--?).



Claim 86 recites the limitation "the detector" in line 2 which is vague and indefinite since it is unclear whether "gas detector" or "electromagnetic radiation detector" is the antecedent basis for this limitation in the claim. Further, claim 86 recites the limitation "the metal layers" in lines 2-3 which is vague and indefinite since it is unclear whether "at least one metal layer" or "first and second electrically conductive metal layers" is the antecedent basis for this limitation in the claim.

Claim 97 recites the limitation "the detector" in line 3 which is vague and indefinite since it is unclear whether "gas detector" or "electromagnetic radiation detector" is the antecedent basis for this limitation in the claim. Further, claim 97 recites the limitation "the two metal layers" in line 1 and the limitation "the metal layers" in line 4 which are vague and indefinite since it is unclear whether "at least one metal layer" or "first and second electrically conductive metal layers" is the antecedent basis for this limitation in the claim. Also, "the electromagnetic waves" on line 2 and again on line 3 and "the incident electromagnetic waves" on line 4 and again on line 6 should probably be --said electromagnetic radiation--.

Claim 100 recites the limitation "the base structure" in line 1. There is insufficient antecedent basis for this limitation in the claim. Further, claim 100 recites the limitation "the detector" in line 2 which is vague and indefinite since it is unclear whether "gas detector" or "electromagnetic radiation detector" is the antecedent basis for this limitation in the claim.

Claim 104 recites the limitation "the reflective surface" in line 10. There is insufficient antecedent basis for this limitation in the claim. Also, "the thermo-electric

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sensor element" on lines 17-18 should probably be --thermoelectric sensor element--;  
"sensor" on line 19 should probably be --said sensor--; and "energy" on line 21 should  
probably be --radiation--.

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all  
obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 57-61, 65, 67, 69-73, 77, 81, 82, 84, 86, 88, 90-94, 98, 100, and 102-104 are rejected under 35 U.S.C. 103(a) as being unpatentable over Peters *et al.* (US 5,550,375) in view of Chen ("Combustible gas sensor fabricated with 3D-microtechnology", pg. 362-365) and Dschen (DE 41 10 653 A1).

In regard to claims **102, 81, 82, 84** (in so far as understood), and **98**, Peters *et al.* disclose (Fig. 3) a gas detector comprising:

- (a) a flat base plate (12) formed of a plastic material (column 3, lines 59-67);
- (b) a gas cell (*i.e.*, free space or cuvette compartment; column 2, lines 26-30) formed by the flat base plate (12) and a hollow chamber of plastic material (column 2, lines 47-49) extending from a surface of the flat base plate (12), the chamber being operative to enclose a volume of gas to be evaluated (it should be noted that the chamber comprises the cavities in front of the entrance and exit slits; column 7, lines 1-12);
- (c) a source of electromagnetic radiation (*i.e.*, radiation source; column 2, lines 36-57) coupled to the gas cell for emission into the chamber;
- (d) a coating (column 2, lines 31-35) on an inner of surface the chamber formed of at least one metal layer which is highly reflective surface with regard to the electromagnetic radiation;
- (e) an electromagnetic radiation detector (*e.g.*, a thermopile; column 3, lines 23-27; column 7, lines 1-12) formed integrally with the flat base plate (12) within the chamber.

The gas detector of Peters *et al.* lacks that the thermopile is mounted on a three-dimensional topographical structure wherein first and second conductive metal layers are located on the topographical structure by application at first and second incidence angles, respectively, wherein the first and second incidence angles are different and other than 90°, so as to form a thermoelectric element (*i.e.*, thermocouple).

Thermopiles are well known in the art. For example, Dschen teaches (Figs. 1, 2, 3a-3c) a thermopile on a three-dimensional topographical structure formed by a plurality of

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thermoelectric junctions (3, 4) on a first plane (5) and a second plane (6) can be formed by the application of two different layers (1, 2) at first and second incidence angles ( $\alpha_1$ ,  $\alpha_2$ ). As another example, Chen teaches (column 1, lines 31-60) a thermopile structure with the hot and cold junctions (*i.e.*, thermocouples) on different planes (introduction on pg. 362), in order to obtain an improved sensitivity thermopile (conclusions on pg. 364). Therefore, it would have been obvious to one having ordinary skill to form the thermopile in the gas detector of Peters *et al.* on a three-dimensional topographical structure by application of the first and second conductive metal layers at first and second incidence angles, in order to obtain an improved sensitivity thermopile as taught by Chen (Dschen).

In regard to claims **104**, **57**, **58**, **60**, **61**, and **77** in so far as understood, Peters *et al.* in view of Chen and Dschen is applied as in claims 102, 81, 82, 84, and 98 above. Peters *et al.* also disclose (column 2, lines 36-57; column 3, lines 45-58) that shaped parts can be produced by a LIGA process (*i.e.*, lithographic etching, electroplating, and casting).

In regard to claim **59** which is dependent on claim 104 in so far as understood, Peters *et al.* also disclose (column 2, lines 53-57) that there is a limited surface region of the base structure, which is less than the entire surface region of the base structure; the method further comprising applying said detector (*i.e.*, IR radiation receiver) on the limited surface region, and applying required electric conductors or electric circuits (*i.e.*, electronic elements) to the thermal element on the limited surface region.

In regard to claim **65** (which is dependent on claim 104 in so far as understood) and claim **86** (which is dependent on claim 102 in so far as understood), Peters *et al.* also disclose (column 2, lines 50-57) electronic elements for amplifying the detector signals. Inherent in detector signal amplifying electronic elements are detector connection pads in order to provide electric conductive paths for transmitting the detector signals from the metal layers of the thermopile detector to the amplifying electronic elements for amplification.

In regard to claims **67** and **71-73** (which are dependent on claim 57 in so far as understood) and claims **88** and **92-94** (which are dependent on claim 81), the method and apparatus of Peters *et al.* lacks a detailed description of the thermopile as an array (*i.e.*, n columns by m ridges) of conductive ridges (having a first thermocouple junction on the ridge upper surface and a second thermocouple junction at an intermediate surface located between mutually adjacent conductive ridges) with each conductive ridge electrically series interconnected. Dschen teaches (abstract; Fig. 1) an array (*i.e.*, n columns by m ridges) of thermocouple junctions (*i.e.*, a thermopile) having a first thermocouple junction on the ridge upper surface and a second thermocouple junction at an intermediate surface located between mutually adjacent conductive ridges. Therefore, it would have been obvious to one having ordinary skill that the thermopile in the method and apparatus of Peters *et al.* is formed as an array (*i.e.*, n columns by m ridges) of conductive ridges (having a first thermocouple junction on the ridge upper surface and a second thermocouple junction at an intermediate surface located

between mutually adjacent conductive ridges) with each conductive ridge electrically series interconnected as is known in the art.

In regard to claims **69** and **70** (which are dependent on claim 67 in so far as understood) and claims **90** and **91** (which are dependent on claim 88), it is inherent in the thermopile of Peters *et al.* that electrically insulated surface sections (without both said first and said second metal layers) are formed at said intermediate conductive surfaces located at surface sections surrounding and adjacent to the thermopile of said base structure since it is clear that the thermopile is of a finite extent and located at one region in order to observe one or a few wavelengths (see column 3, lines 28-31).

In regard to claim **100** which is dependent on claim 102 in so far as understood, Peters *et al.* also disclose (column 2, lines 53-57; column 3, lines 28-33) rows of radiation receivers.

In regard to claim **103** which is dependent on claim 102, Peters *et al.* also disclose (column 2, lines 36-57) that the circuit arrangements for the conductive metal layers are located outside the chamber.

11. Claim 62 is rejected under 35 U.S.C. 103(a) as being unpatentable over Peters *et al.* (US 5,550,375) in view of Chen ("Combustible gas sensor fabricated with 3D-microtechnology", pg. 362-365) and Dschen (DE 41 10 653 A1) as applied to claim 104 above, and further in view of Larsson (Micro Structure Workshop 1996, pp. 5.1-5.8).

In regard to claim **62** which is dependent on claim 104 in so far as understood, the modified method of Peters *et al.* lacks forming the mold for the shaping operation by mechanically working a substrate, wherein the configuration of the substrate is

complementary with respect to the topographical structure to be formed.

Microreplication techniques are known in the art. For example, Larsson teaches (Fig. 1; sections on Microreplication technology and Micromachining of the master) to choose the type of master fabrication technique (e.g., micromachining instead of LIGA which is expensive) depending on application, costs, development time and needed accuracy. Therefore, it would have been obvious to one having ordinary skill to use micromachining in the modified method of Peters *et al.*, in order to use a less expensive master fabrication technique.

12. Claims 64, 68, 76, 78, 85, 89, 97, and 99 are rejected under 35 U.S.C. 103(a) as being unpatentable over Peters *et al.* (US 5,550,375) in view of Chen ("Combustible gas sensor fabricated with 3D-microtechnology", pg. 362-365) and Dschen (DE 41 10 653 A1) as applied to claims 67, 88, 98, 102, and 104 above, and further in view of Baxter (US 4,111,717).

In regard to claim **64** (which is dependent on claim 104 in so far as understood) and claim **85** (which is dependent on claim 102 in so far as understood), Peters *et al.* also disclose (column 2, lines 31-35) that the surface of the cavity should be coated with metal layer having good reflectivity in the spectral range used (*i.e.*, IR radiation). The modified method and apparatus of Peters *et al.* lacks that the interior of the cavity is coated with the same metal as the topographical structure of the detector at the same time. Baxter teaches (column 3, lines 17-31) that a thermopile is coated with a metal that serves the dual purpose of forming a cold thermocouple junction and a heat (*i.e.*, IR radiation) reflector. Therefore, it would have been obvious to one having ordinary skill

to coat the cavity surface with the same metal used to form the thermocouple junctions of the thermopile in the modified method and apparatus of Peters *et al.* in order to obtain a cavity surface having good reflectivity in the spectral range used (*i.e.*, IR radiation).

In regard to claim **68** (which is dependent on claim 67 in so far as understood) and claim **89** (which is dependent on claim 88), the modified method and apparatus of Peters *et al.* lacks that the topographical structure including the ridges are positioned relative to incident electromagnetic waves so that the waves irradiate the upper surfaces of the ridges but the ridges shadow the intermediate conductive surfaces against incident electromagnetic waves. Baxter teaches (column 3, lines 46-55) to provide a reflective area overlying a portion of the cold junctions in order to reduce the influence of stray radiation on the cold junctions. Therefore, it would have been obvious to one having ordinary skill to provide a reflective area (*e.g.*, hot junctions) overlying a portion of the cold junctions on intermediate conductive surfaces in the modified method and apparatus of Peters *et al.*, in order to reduce the influence of stray radiation on the cold junctions (*i.e.*, the cold junctions will be in the shadow of the hot junctions on conductive ridges).

In regard to claim **76** (which is dependent on claim 68 in so far as understood) and claim **97** (which is dependent on claim 89 in so far as understood), it is inherent in the modified method and apparatus of Peters *et al.* that the first metal has a first reflection coefficient with respect to the electromagnetic waves and the second metal has a second reflection coefficient with respect to the electromagnetic waves. The



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modified method and apparatus of Peters *et al.* lacks that parts of the detector are positioned relative to the incident electromagnetic waves and the metal layers and the conductive ridges are so positioned that the metal having the lowest of the first and second reflection coefficients covers the side surfaces of the ridges that face the incident electromagnetic waves. Baxter teaches (column 3, lines 46-55) to provide a reflective area (e.g., gold) overlying a portion of the cold junctions in order to reduce the influence of stray radiation on the cold junctions. It should be noted that by definition, a material with a low reflection coefficient has less reflected radiation than a material with a higher reflection coefficient. It should also be noted that stray radiation comprises of reflected incident radiation. Therefore, it would have been obvious to one having ordinary skill to position the surface of said detector relative to incident electromagnetic waves in the modified method and apparatus of Peters *et al.* so as to provide a reflective area (e.g., the first metal forming the cold junction with a lower reflection coefficient than the second metal forming the cold junction) overlying a portion of the cold junctions, in order to reduce the influence of stray radiation on the cold junctions.

In regard to claim **78** (which is dependent on claim 76 in so far as understood) and claim **99** (which is dependent on claim 98), the modified method and apparatus of Peters *et al.* lacks that the first and second metal layers respectively comprise gold covering chromium. Baxter teaches (column 2, line 65 to column 3, line 40) it is well known in the art that thermopiles comprise of a plurality of hot and cold thermocouple junctions formed by the joining of two electrical conductors of different composition such as for example chromium alloy or gold. Therefore, it would have been obvious to one

having ordinary skill to that the thermopile in the modified method and apparatus of Peters *et al.* comprise of different types of conductors such as gold and chromium.

13. Claims 74, 75, 95, and 96 are rejected under 35 U.S.C. 103(a) as being unpatentable over Peters *et al.* (US 5,550,375) in view of Chen ("Combustible gas sensor fabricated with 3D-microtechnology", pg. 362-365) and Dschen (DE 41 10 653 A1) as applied to claims 67 and 88 above, and further in view of Baxter (US 4,111,717) and Grinberg *et al.* (US 4,922,116).

In regard to claims **74** and **75** (which are dependent on claim 67 in so far as understood) and claims **95** and **96** (which are dependent on claim 88), the modified method and apparatus of Peters *et al.* lacks a heat absorbent layer (e.g., carbon) covering the upper surface of each of the ridges; and a heat reflecting layer (e.g., a metal) covering the intermediate conductive surfaces between adjacent ridges. Baxter teaches (column 3, lines 46-55) to provide a reflective area (e.g., gold) overlying a portion of the cold junctions in order to reduce the influence of stray radiation on the cold junctions. Grinberg *et al.* teach (column 9, lines 60-64; column 11, lines 35-38) that the upper surface of the bridges is covered with a heat-absorbent layer (e.g., carbon black, metallic gold black, or black paint) in order to increase the temperature variation. Therefore, it would have been obvious to one having ordinary skill to provide a heat-absorbent layer on upper surface of respective conductive ridges and heat-reflecting layer on the cold junctions at intermediate conductive surfaces in the modified method and apparatus of Peters *et al.*, in order to reduce the influence of stray radiation and increase the temperature variation as taught by Baxter and Grinberg *et al.*

***Respons to Arguments***

14. Applicant's arguments with respect to claims 57-62, 64, 65, 67-78, 81, 82, 84-86, 88-100, and 102-104 have been considered but are moot in view of the new ground(s) of rejection.

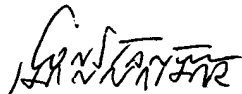
***Conclusion***

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shun Lee whose telephone number is (703) 308-4860. The examiner can normally be reached on Tuesday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (703) 308-4852. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

SL  
March 5, 2003

  
CONSTANTINE HANNAHER  
PRIMARY EXAMINER  
GROUP ART UNIT 2878